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Opportunistic infections emerging: Aeromonas and Stenotrophomonas Complexities in a Geriatric Patient

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Abstract:

This case report discusses the clinical journey of an 86-year-old male with various pre-existing medical conditions. The patient's admission to the hospital due to COVID-19 pneumonia led to a series of critical events, including ICU admissions, respiratory complications, and challenges in managing his preexisting conditions. Throughout his hospital stay, the patient experienced multiple complications, including respiratory difficulties; upper gastrointestinal bleeding; and neurological, cardiovascular, and gastrointestinal findings. The administration of different antibiotic regimens based on the results of tracheal secretion cultures was a key aspect of his treatment.

Analysis of the involved microorganisms, such as *Aeromonas veronii* and *Stenotrophomonas maltophilia*, revealed their role as emerging opportunistic pathogens in aquatic and hospital environments. The virulence of these microorganisms and their antibiotic resistance present significant challenges for clinical management. This case underscores the complexity of clinical management in geriatric patients with multiple preexisting medical conditions. The patient's unfortunate demise underscores the inherent difficulties in managing complex clinical cases, particularly in the elderly. Furthermore, the discussion of antimicrobial resistance in *S. maltophilia* highlights the need for effective treatment strategies and control measures to address the challenges posed by this bacterium.

This case report sheds light on the relevance of disseminating information about emerging opportunistic infections and the complexities they present in geriatric patients.

Keywords: Aeromonas veronii; Stenotrophomonas maltophilia; pneumonia; Case Reports; Aged; Opportunistic Infections.

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1. Introduction

Aeromonas is a genus of Gram-negative bacteria commonly found in aquatic environments, such as freshwater and saltwater (1). Although many strains of Aeromonas are harmless and occur naturally in the environment, some strains can be pathogenic to humans and other animals (2–4). These bacteria have adaptability and virulence (5), which allows them to cause intestinal and systemic infections in immunocompromised individuals (6,7). They can produce virulence factors such as toxins and adhesins, and have been observed to trigger a variety of health problems, especially in hospital settings (2,8,9).

The genus *Stenotrophomonas* comprises a group of Gram-negative bacteria widely distributed in natural environments, including soil and water. (10–12). Although some strains are considered commensal and non-pathogenic, certain species, such as *S. maltophilia*, are known to be opportunistic pathogens. (13,14). These bacteria are especially relevant in hospital settings and in individuals with weakened immune systems (13).

In the present case report, we examine the complex medical history of an 86-year-old male with a number of medical history and preexisting conditions. This patient, who had hypertension, hypothyroidism, a history of elevated CEA and beta 2 microglobulin, as well as prediabetes, cervicobrachial syndrome and other medical diagnoses, was admitted to the hospital due to COVID-19 pneumonia.

During his stay, he experienced multiple complications, including respiratory difficulties that required care in the Intensive Care Unit (ICU) on two separate occasions. Throughout his hospitalization, various aspects of his medical evolution were observed, such as his antibiotic management, upper gastrointestinal bleeding, and findings in areas such as neurological, cardiovascular, metabolic and gastrointestinal. However, despite medical efforts, the patient unfortunately passed away. This case highlights the challenges and complexity that can arise in the management of geriatric patients with multiple pre-existing medical conditions, especially in the context of severe infections such as COVID-19 pneumonia.

2. Case report

The case involves an 86-year-old male with a number of medical history and pre-existing conditions. The patient had hypertension treated with losartan, hypothyroidism controlled with levothyroxine 100 mcg, plus a history of elevated CEA at 7.35 and beta 2 micro-globulin at 2838. He had also been diagnosed with prediabetes in 2018, cer-vicobrachial syndrome, prostatic hypertrophy, and had undergone cholecystectomy. His medical history revealed a smoking habit for more than three decades.

The patient was admitted to the hospital due to COVID-19 pneumonia that developed from July 23 to August 2. During this period, he required care in the Intensive Care Unit (ICU) from July 24 to July 27 due to respiratory complications and a hi-persecretory state related to COVID-19 pneumonia (Figure 1).



Figure 1. Chest control X-ray on admission to the ICU. Source: Synapse System.



During the first admission to the ICU, the patient, an 86-year-old man, presented with acute respiratory distress due to COVID-19 and unspecified pneumonia. Sputum cultures taken on July 23 revealed the presence of *Klebsiella ozaenae* and *Enterobacter cloacae*, both multisensitive microorganisms, so he was rotated to a regimen with piperacillin/tazobactam (Pip/Taz) until July 25, when it was decided to rotate to imipenem due to persistence of secretions and reporting of results until his transfer to hospitalization. His neurological status was stable, with Glasgow 15/15. At respiratory level, he had oxygen saturation of 98%, saturating 99% on room air, respiratory rate of 24 breaths per minute, with persistent cough and poor management of secretions. His cardiovascular condition did not require vasopressors and his vital signs were within normal ranges. In the nephro-metabolic aspect, he had a negative water balance and values within normal ranges. He had a pressure ulcer on the right hip. The hematological aspect showed adequate hemoglobin and platelet levels. In the gastrointestinal area, he had multiple findings including esophagitis B, erosive gastropathy and pre-pyloric gastric ulcer. Regarding antibiotic management, cef-triaxone 1g IV every 12 hours was started on July 28 until August 2 (date of hospital discharge) and clarithromycin 500 mg IV every 12 hours until August 6 with rotation to oral route at hospital discharge.

During the patient's second emergency admission, respiratory difficulties and inadequate management of secretions occurred, which led to his readmission to the ICU.

During his 4-day stay in the ICU, he experienced an upper gastrointestinal hemorrhage that was treated by a bandage, a procedure that was performed without complications. Neurologically, he remained awake, calm, oriented in person and space, with a GCS of 15/15. At the respiratory level, he presented oxygen saturation of 98% with oxygen support, respiratory rate of 24 RPM, and crepitant rales due to hypersecretion (Figure 2). Cardiovascular, nephro-metabolic and gastrointestinal aspects were also observed, all monitored and managed within normal parameters.



Figure 2. Control Chest X-ray of control Chest. Source: Synapse System..

Regarding antibiotic treatment, the results of tracheal secretion cultures showed the presence of *E. cloacae* and *A. veronii* with specific sensitivities to several antibiotics (Table 1). Based on these results, treatment schedules with sensitive antibiotics were established. In addition, a closure was performed due to upper gastrointestinal bleeding, without complications in the procedure. Subsequently, during his stay in the ICU, additional microbiological culture results were observed..

During the second admission to ICU, the patient received the following antibiotic regimens:

1. Since August 8, 2021, treatment was started with Pip/Taz at a dose of 4.5 grams intravenously every 6 hours. This schedule was maintained for a period of 4 days.
2. 2. Beginning August 12, 2021, Meropenem was started at a dose of 1 gram intravenously every 8 hours. This treatment was maintained for a period of 10 days.

These antibiotic schemes were established based on the results of tracheal secretion cultures, where the microorganisms present were identified and their sensitivity to antibiotics was determined. Antibiotics were selected according to their ability to treat the infections caused by the microorganisms identified in the cultures.



Table 1. Report of microbiological isolates with antimicrobial sensitivity expressed based on minimum inhibitory concentration (MIC). *Source: Patient's clinical history*

Bronchial secretion culture results *

Isolation: *Enterobacter cloacae*

Antimicrobial	**MIC**	**Interpretation**
Amikacin	<=8	Sensible
Ertapenem	<=0,25	Sensible
Imipemen + Cilastin	<=0,25	Sensible
Meropenem	<=0,25	Sensible
Ciprofloxacin	<=0,25	Sensible
Gentamicine	4	Sensible
Piperacillin + Tazobactam	>64	Resistent

Isolation: *Aeromonas veronii* biovar *sobria*

Antimicrobiano	**CIM**	**Interpretation**
Amikacin	<=8	Sensible
Cefepime	<=1	Sensible
Imipemen + Cilastin	<=0,25	Sensible
Meropenem	<=0,25	Sensible
Ceftazidime	<=1	Sensible
Ciprofloxacin	<=0,25	Sensible
Gentamicine	4	Sensible
Piperacillin + Tazobactam	4/4	Sensible

* Two bronchial aspirate specimens were obtained through the patient's endotracheal tube *Enterobacter cloacae* and *Aeromonas veronii*, the report was given on 10/08/2021

The patient experienced persistent respiratory complications and unfortunately died. The information collected suggests the presumption of reinfection at the time of data collection. As of August 23, 2021, treatment was started with Cotrimoxazole 800/160 mg orally every 12 hours, based on the results of sputum cultures which showed the presence of Stenotrophomonas maltophilia with sensitivity to Trimethoprim-ma-Sulfamethoxazole and resistance to Ceftazidime and Levofloxacin and pleural fluid with negative results for microorganisms, categorized as pleural effusion for pneumonia on August 26, 2021, from which about 644. 7 cc. Throughout his stay, gastrointestinal (esophagitis B of the Los Angeles classification; erosive gastropathy and pre-pyloric gastric ulcer Forrest III, without active bleeding; large ulcer of duodenal bulb Forrest III, without active bleeding, August 12: histopathological report: mild chronic duodenitis) and pleural findings were recorded in the studies performed, in addition to histopathological reports related to his health. In conclusion, the patient presented considerable clinical complexity, with diverse medical conditions and complications in multiple systems. The patient's death underscores the difficulties inherent in the management of complex clinical cases, especially in elderly patients with a variety of pre-existing medical conditions.

Ethical Aspects:

For the preparation of this case report, the ethical principles established in the Declaration of Helsinki and the Organic Law of Health of Ecuador were rigorously followed. In compliance with these regulatory frameworks, written informed consent was obtained from the relatives or legal guardians of the patients involved in the study.

In addition to informed consent, additional measures were taken to protect patient privacy and confidentiality. Numerical codes or identifiers were used instead of real names in the case report, avoiding any form of personal identification. All information collected was handled in accordance with confidentiality standards and ensured that only the research team had access to it.



3. Discussion

The microorganisms *Aeromonas veronii* and *Stenotrophomonas maltophilia*, belonging to the genera *Aeromonas* and *Stenotrophomonas*, respectively, stand out as emerging opor-tunistic pathogens with wide distribution in aquatic and hospital environments. *A. veronii*, part of the genus *Aeromonas*, exhibits adaptability and virulence in different hosts, including humans (4,5,8,9). With virulence factors such as toxins, adhesins and secretion systems, these bacteria can trigger intestinal and systemic infections in immunocompromised individuals (2,2,6,15). Its presence in aquatic and hospital environments highlights the importance of hygienic measures to prevent its spread (1,4,9,16,17).

On the other hand, *S. maltophilia*, previously known as *Pseudomonas maltophilia*, is a Gram-negative bacterium widely distributed in natural environments and hospitals (11,12,14). Although it can be commensal, it has emerged as an opportunistic pathogen, especially in immunocompromised individuals (10,14). This bacterium is resistant to multiple antibiotics, making it difficult to treat (13). Its presence in medical devices and ability to be transmitted between patients underscores the importance of control and prevention measures (11,14).

Analysis of the prevalence of antibiotic resistance in *S. maltophilia* reveals the need for effective treatment strategies and control measures (13). Infections with this bacterium range from pneumonia to skin infections, and its antimicrobial resistance is a challenge (13). Knowledge about the prevalence of resistance and emerging patterns will enable informed decision making for the management of *S. maltophilia* infections (11,13,14).

4.Conclussions

The case details the medical history of an 86-year-old male with a diverse medical history and pre-existing conditions. His admission to the hospital for COVID-19 pneumonia led to a series of critical events, including ICU admissions, respiratory complications, and difficulties in managing his pre-existing conditions.

Throughout his hospital stay, the patient faced multiple complications, including respiratory difficulties, upper gastrointestinal bleeding and findings in neurological, cardiovascular and gastrointestinal areas. The administration of different antibiotic regimens based on the results of tracheal secretion cultures was a key aspect in his treatment.

Analysis of the microorganisms involved, such as *A. veronii* and *S. maltophilia*, reveals their role as emerging opportunistic pathogens in aquatic and hospital environments. The viru-lence of these microorganisms and their resistance to antibiotics present significant challenges for their clinical management.

The case highlights the complexity of clinical management in geriatric patients with multiple preexisting medical conditions. The patient's death underscores the inherent difficulties in managing complex clinical cases, especially in elderly individuals. In addition, the discussion of antimicrobial resistance in *S. maltophilia* highlights the need for effective treatment strategies and control measures to address the challenges presented by this bacterium.

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